

75TH ANNIVERSARY CELEBRATION

2026 AAID ANNUAL CONFERENCE

HONORING
THE PAST

ENGINEERING
THE FUTURE





Taking out the garbage:
removing failed abutments, screws, and implants

Bill Holden, BSc DDS DABOI

First, let's get our nomenclature straight:

Abutment screw:

affixes abutment, mesobar, or prosthesis directly to the implant

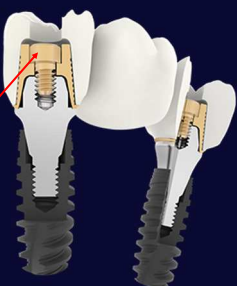
Prosthetic screw:

in the past sometimes called an "attachment screw"
affixes prosthesis or mesobar to an intermediate abutment, *e.g.* an MUA

Set screw:

affixes a restoration to an abutment in a lateral direction to retain the restoration to the abutment without cement





prosthetic screw

Set screws, aka lateral screws



Often a flat blade screw head.

Four main things can go haywire with a screw:

Loosening:

by far the most common screw complication

Cross-threading:

the screw does not engage the threading as designed

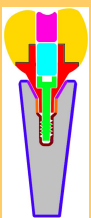
Stripping:

the screwdriver will no longer engage the head in one or both directions

Shearing:

the screw deforms and usually separates into two pieces, aka the "broken screw"

2a. Screw loosening



The #1 complication we get referred in is abutment screw loosening

- More common than cement sepsis
 - More common than porcelain fracture.
 - More common than any surgical complication.
 - Even more common than peri-implantitis (which is #2).
 - More common than interproximal contact opening up (which is #3).
- Fun (?) fact: prosthetic complications vastly outnumber surgical complications.

Why do abutment and prosthetic screws loosen?

- Occlusion and parafunction
- Lack of occlusal table
- Other teeth increasingly mobile
- Inadequate initial torque
- Prosthetic misfit
- Poor interface mating
- Old age and bad luck

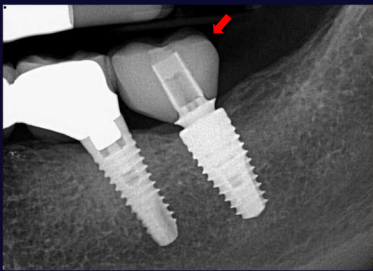


1. Is this an emergency?

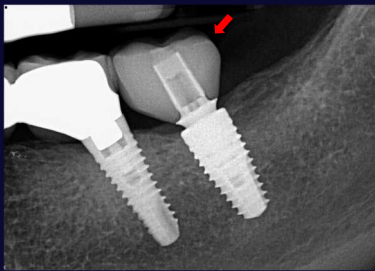


- 48M
- 37 (US18) loose for four months

supplied radiograph



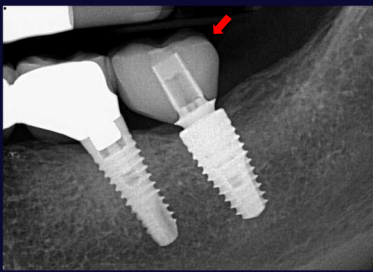
- Set yourself a time limit
- Rebook pt if needed
- Don't rush and damage the implant!
- Be prepared to have to temporize
- What is a "shutdown"?



2. How do I know if it is the screw that is loose?

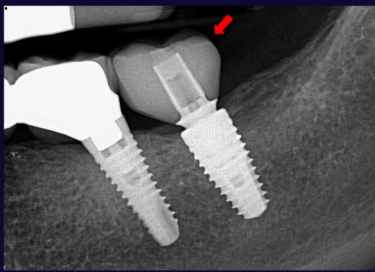
- 48M
- 37 (US18) loose for four months

supplied radiograph



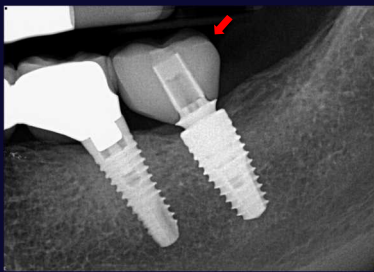
3. Informed consent

- This is a "rescue mission"
- Hopefully it is just the screw
- The abutment screw and even the whole restoration may need replacement

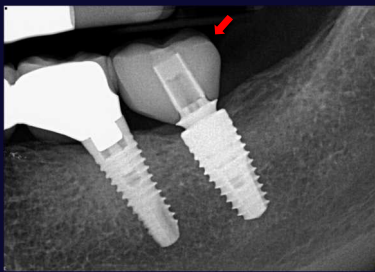


4. Access the screw

- Screw ret vs cemented
- What kind of cement?
- Where is the access hole?
- Did previous dds use blockout over the screw?

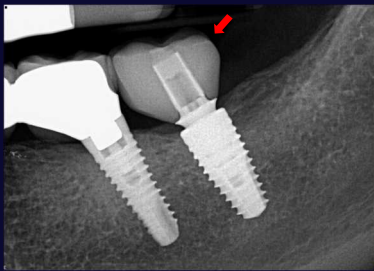


4. Confirm that it tightens. Why?



But wait, what screwdriver, and how much torque?

- Why do we need to know?
- What happens if we guess wrong?



Skills you need:

- Taking decent radiographs
- Enhancing radiographs
- Exporting radiographs
- Using measuring tool

So our cheat sheet reads:

1. Offset internal interface → trilobe
2. Look for the “Zimmer gap”
3. Reverse buttress threads → BH internal
4. Look for internal taper versus parallel
5. Look for external hex
6. Open threads at crestal → Hiossen or similar
7. Looks like a tulip → Straumann Tissue Level

This should pick up many of the common implants you will see every day.

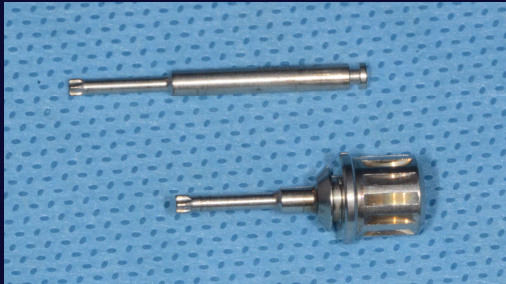
A screenshot of a dental instrument kit listing. It shows a "Dental Universal Implant Instrument Prosthetic Hand Driver Tool Kit" with a price of US \$89.99. The kit includes various tools for implant removal, such as drivers and wrenches. The listing also mentions "135°C Autoclavable" and "Made in the USA".

A photograph of a dental instrument kit. It shows a blue plastic case with a handle, containing various tools for implant removal. The tools are arranged in a grid, and the case is open, showing the tools inside.

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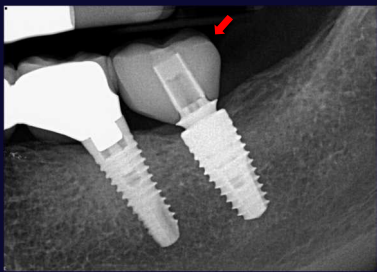
A photograph of a dental instrument kit. It shows a blue plastic case with a handle, containing various tools for implant removal. The tools are arranged in a grid, and the case is open, showing the tools inside.

Strategy 2: Build up an inventory of latch or 4mm square drivers over time, that fit the prosthetic kit from your regular system.



6. Remove screw & prosthesis, assess, disinfect

- Turn screw in a piece of gauze
- Inspect with loupes, esp the screw head
- Replace screw if damaged
- We dunk crown and screw in straight bleach
- You can always test screw and abutment and implant using other parts



Abutment screws do suffer wear and tear in the lab.

Homework project: confirm with your lab that they are using lab screws.



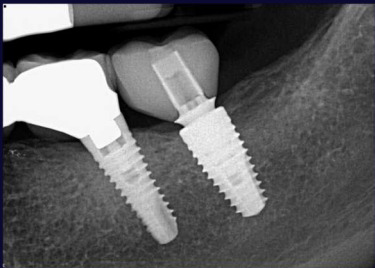
Loose for a while, or repetitive loosening?

Check the restoration in a known good analog.
Check an impression coping or other known good part in the implant interface.



7. Re-insert, re-torque screw(s)
8. Close screw access or recement crown

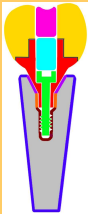
- Why did it come loose in the first place?
- Occlusion occlusion occlusion
- Concept of “coining” surfaces
- Can blockout material stabilise screw?



Our recipe for managing a loose abutment screw

1. Don't panic. This is not an emergency.
2. Try to confirm whether it is the screw that is loose, or something else.
3. Warn patient that this is a rescue mission, and obtain informed consent.
4. Access the screw.
5. Confirm it re-tightens.
6. Remove screw and prosthesis, assess both and disinfect.
7. Re-insert and re-torque screw(s).
8. Re-close screw access hole or re-cement crown.

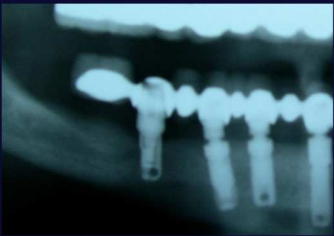
2b. Cross-threaded screws



Cross threading of screws is now rare, except...

...when the wrong screw is used

- this mix-up can occur in the lab
- can damage int / ext threads
- healing abutments also possible
- rumoured to be more common with gold screws
- If it binds, stop and figure out why!



Re-tapping damaged implant threads

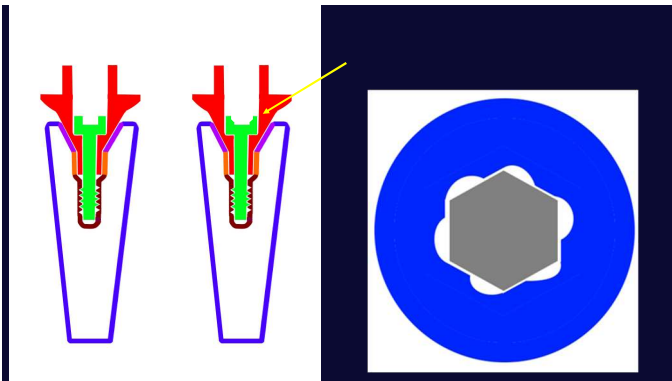
- Official "thread taps" are available in some implant rescue kits
- A known good screw is usually adequate
- Know the threading of the main implants you use
- Know the material of your implants and screws



GLIDEWELL DIRECT		Titanium Screw Guide	
FORMER AND LATERAL PRODUCT PHOTOGRAPH			
Part Number	Part Name	Part Description	Part Length
01-001	0.001" (0.025mm) Dia	0.001" (0.025mm) Dia	0.001" (0.025mm) Dia
01-002	0.002" (0.050mm) Dia	0.002" (0.050mm) Dia	0.002" (0.050mm) Dia
01-003	0.003" (0.075mm) Dia	0.003" (0.075mm) Dia	0.003" (0.075mm) Dia
01-004	0.004" (0.100mm) Dia	0.004" (0.100mm) Dia	0.004" (0.100mm) Dia
01-005	0.005" (0.125mm) Dia	0.005" (0.125mm) Dia	0.005" (0.125mm) Dia
01-006	0.006" (0.150mm) Dia	0.006" (0.150mm) Dia	0.006" (0.150mm) Dia
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01-010	0.010" (0.250mm) Dia	0.010" (0.250mm) Dia	0.010" (0.250mm) Dia
01-011	0.011" (0.275mm) Dia	0.011" (0.275mm) Dia	0.011" (0.275mm) Dia
01-012	0.012" (0.300mm) Dia	0.012" (0.300mm) Dia	0.012" (0.300mm) Dia
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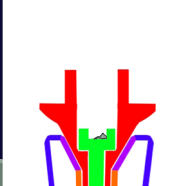
Stripping of screw heads typically occurs when...

- The wrong screwdriver is used
- A damaged screwdriver is used
- The screwdriver is not inserted all the way into the screw head
- Strip can be CW or CCW or both



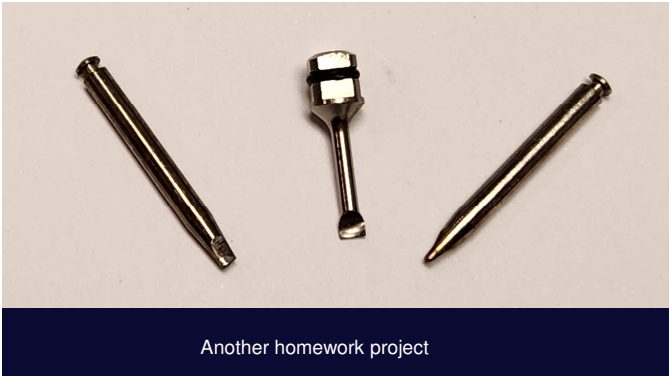
Managing a stripped screw head

1. Don't panic. This is not an emergency.
2. Warn patient that this is a rescue mission, and obtain informed consent.
3. Visual access, magnification, illumination
4. Clean out the screw head thoroughly.

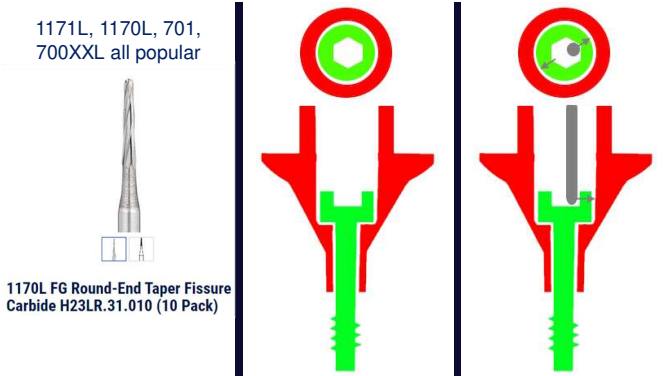


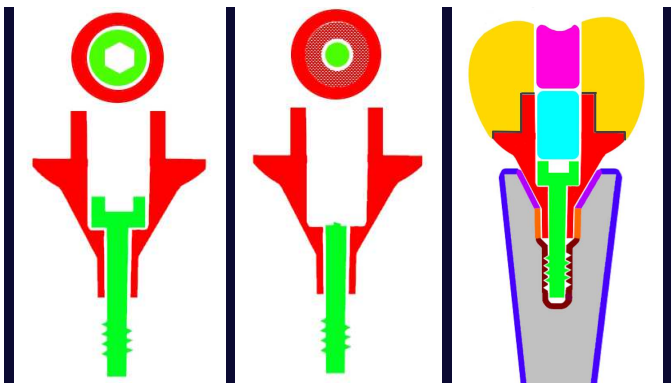
Managing a stripped screw head

1. Don't panic. This is not an emergency.
2. Warn patient that this is a rescue mission, and obtain informed consent.
3. Visual access, magnification, illumination
4. Clean out the screw head thoroughly.
5. Try other screwdrivers.
6. Cut a slot in the screw head and use a flat blade screwdriver.



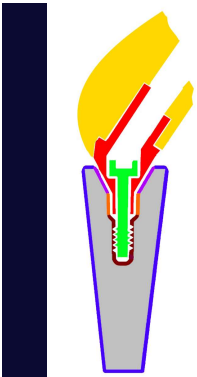
Another homework project





Angulated screw channel (“ASC”) crowns

- A handy option for cases where screw would come out the facial
- Requires specific screwdriver
- The bad news? There are four or five different angled screwdrivers out there. ☹



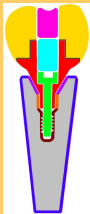
A stripped or sheared screw in an angled access often results in a “cutdown” (destroying the crown) to manage. ☹

So our cascade for a stripped screw head is:

1. Don't panic. This is not an emergency.
2. Warn patient that this is a rescue mission, and obtain informed consent.
3. Visual access, magnification, illumination
4. Clean out the screw head thoroughly.
5. Try other screwdrivers.
6. Cut a slot in the screw head and use a flat blade screwdriver.
7. Amputate the screw head.



2d. Sheared screws



Good news!

The frequency of screws shearing seems to be going down.

- Materials
- Manufacturing
- Instrumentation
- Techniques and training

However: screw shaft diameter is an issue, and the increase in smaller diameter implants (e.g. 3.0mm) means more small screws are in the wild.

Bad news...

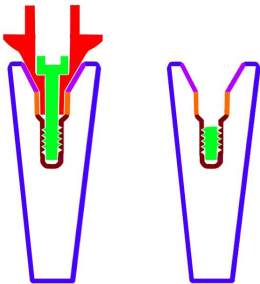
The incidence of screws shearing seems to be going up.

- More implants placed
- More older screws and implant designs in the wild.

Someone is going to have to deal with all these, and if you are here in the room today, it's probably you. ☹

Possible causes of sheared screws include:

- Overtorque
- Multiple torques
- Inaccurate fit / wrong abutment
- Loose restoration
- Occlusion
- Use of impact crown & bridge remover
- Wrong / defective / old screw



Time to talk torque wrenches...



Breakneck torque wrench



"Tong" style torque wrench—
correct team is "beam" style



Breakneck torque wrenches...

- Require maintenance and calibration
- Must always be sterilised and stored in the broken position
- Will lose accuracy over time, *usually* dropping off
- Beam style seem to stay accurate
- Others? It varies, don't chance it.

200/575



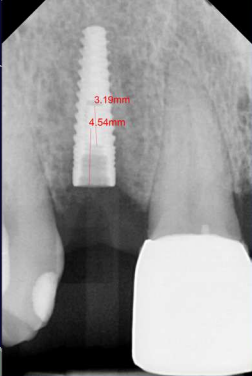
Screws suffer wear and tear in the lab

- Homework project: confirm with your lab that they are using lab screws



Important concepts:

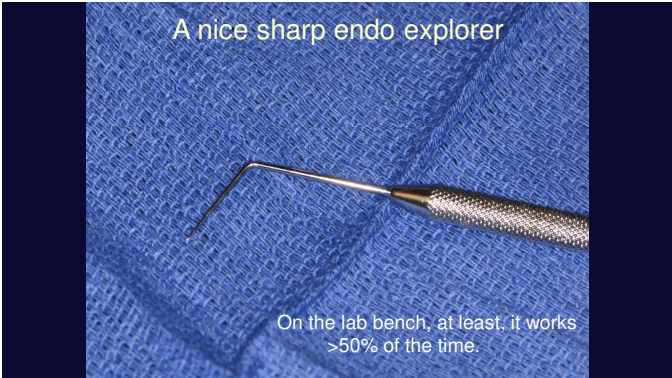
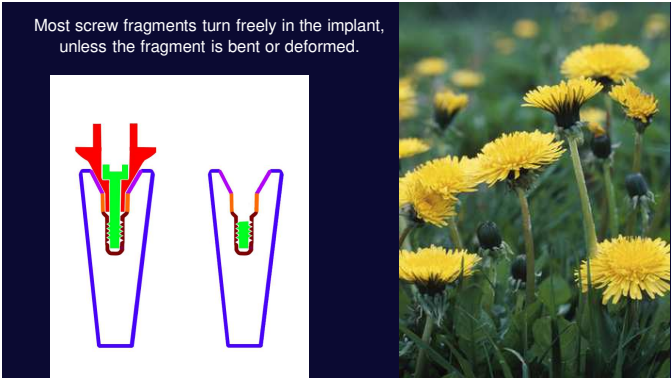
- Abutment screws tend to shear right where the threads start
- Again, the measuring function in your radiography software is vital
- Also: learn to adjust brightness and contrast until you can see the fragment!
- Compare the loose piece to a known good screw, to get a sense of how big the fragment is.



Removing a sheared abutment screw fragment

1. Don't panic. This is not an emergency.
2. Warn patient that this is a rescue mission, and obtain informed consent.





Removing a sheared abutment screw fragment

1. Don't panic. This is not an emergency.

2. Warn patient that this is a rescue mission, and obtain informed consent.

3. Visual access, magnification, illumination, radiograph.

4. Wind out the fragment with an endo explorer.

5. Slow speed, reverse, with fragment forks.

M1.4 / 1.6

M1.8 / 2.0

COOKBOOK

Fragment forks (aka screw forks)

An inverted cone bur is not the same!

You really only need two:

M1.4 / 1.6

M1.8 / 2.0

Small and Large
(MUA = M1.4)

Removing a sheared abutment screw fragment

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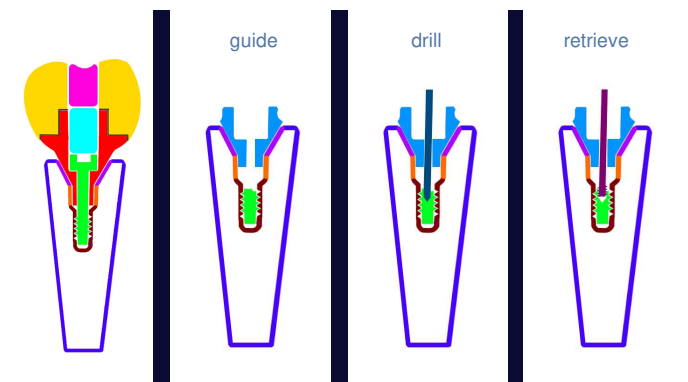
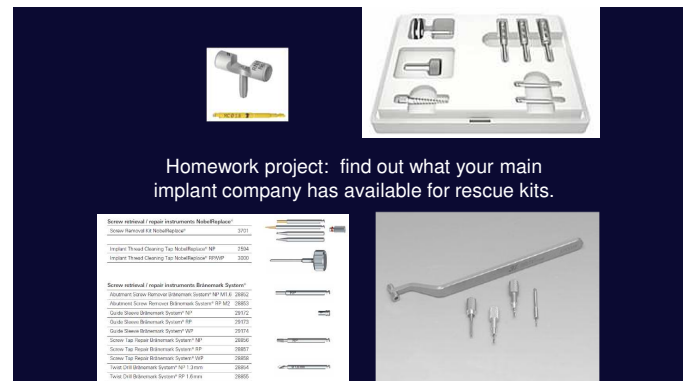
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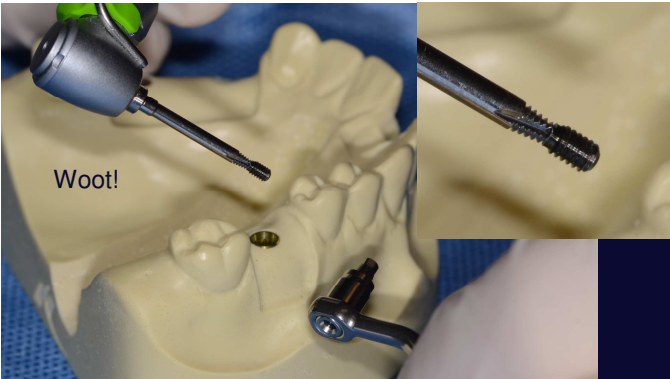
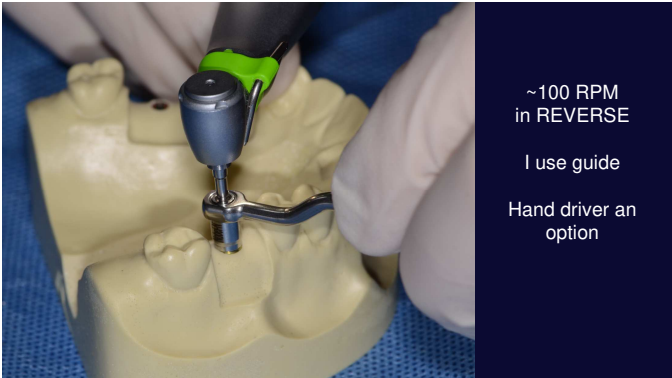
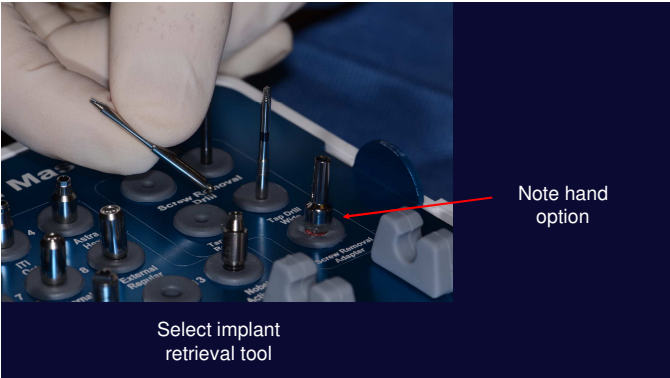
6. Screw retrieval kits.

COOKBOOK

Bill Holden

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Desperate times call for desperate measures

- Ultrasonic or piezo to vibrate fragment out
- Try to kick the fragment CCW with a high speed bur
- Drive the fragment apically out of the way
- Slot the fragment (good luck)
- Removal by attrition—drill the damned thing out
- Cement restoration into the implant
- Replace the implant and live to fight another day

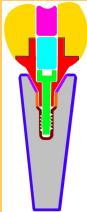


So our cascade for a sheared abutment screw is:

1. Don't panic. This is not an emergency.
2. Warn patient that this is a rescue mission, and obtain informed consent.
3. Visual access, magnification, illumination, radiograph.
4. Wind out the fragment with an endo explorer.
5. Slow speed, reverse, with fragment forks.
6. Screw retrieval kits.
7. Desperate measures.



3. Abysmal abutments





Why do abutments fail?

- Inadequate structure
- Weak or brittle materials
- Occlusion or parafunction
- Materials compromised in laboratory
- Trauma
- Old age and bad luck

Potential aftermarket restorative parts

- impression copings and analogs
- scan bodies and digital/print analogs
- overdenture attachments
- stock and UCLA abutments
- CAD/CAM abutments
- Ti-bases and angled Ti-bases
- Plus abutment and prosthetic screw, PMEs (multi-unit abutments), temp cylinders, and screwdrivers

After-market parts...

- Are never "100% compatible"
- Higher rate of screw loosening, likely due to the screw seat / screw head interface
- May be designed for a different torque value (!)
- May use a different screwdriver (!!!)
- Seem to exhibit a higher rate of abutment failure

After-market parts...

- Are never "100% compatible"
- Higher rate of screw loosening, likely due to the screw seat / screw head interface
- May be designed for a different torque value (!)
- May use a different screwdriver (!!!)
- Seem to exhibit a higher rate of abutment failure
- Use only with experience, in specific justifiable situations, and still with caution

Pigtail implant removal tool



Managing a “stuck” abutment or fragment

- 1. Don't panic. This is not an emergency.
- 2. Take a radiograph.
- 3. Warn patient that this is a rescue mission, and obtain informed consent.
- 4. If a one-piece, thread timed abutment: attempt to unscrew
- 5. If a two piece, non-threaded but intact abutment that is just stuck: wiggle, tap, pull, vibrate, lever, drill
- 6. If a two piece, internally threaded abutment that is just stuck: abutment removal tool or the “paperclip technique”



1. Is this an emergency?



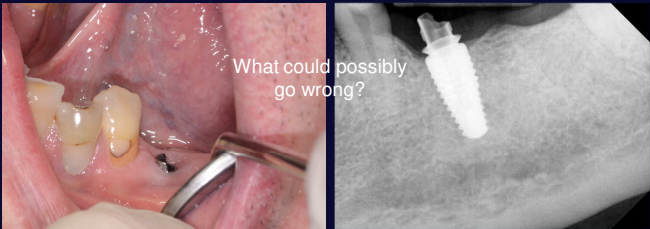
No.
Not even close.



2. Why do we want a radiograph here?



3. Informed consent



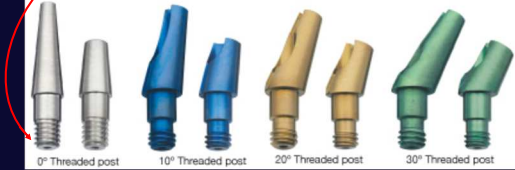
4. One piece, thread timed abutments

- *****Confirm that the abutment is NON-ENGAGING*****
- Use driver to rotate out if possible
- Attempt to grab and rotate out
- Cut a slot and use a flat blade to rotate it out

Special situation

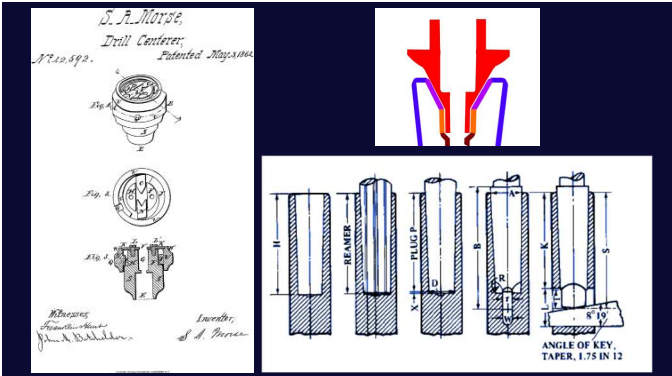
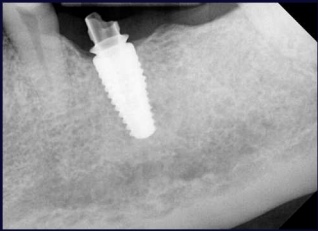
Tatum Traditional Unipost Abutments

Beware that Tatum are counter-clockwise threaded



5. Two piece, non-threaded

- Why is it stuck?
- How do we get it out?



Morse taper: 1.5° on each side, so 3° total taper

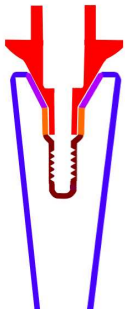
Astratech taper: 11.5° total taper

It's not technically a Morse Taper, or cold welded, but it's still tight enough that it is stuck.

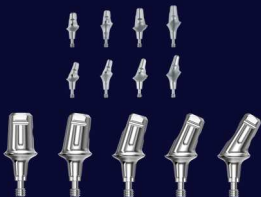


5. Two piece, non-threaded

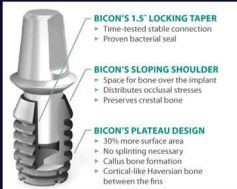
- Strategies to break the seal:
 1. Bending force
 2. Vertical tapping
 3. Vertical pulling
 4. Vibration
 5. Leverage
 6. Cutting



Special situations: Ankylos and Bicon

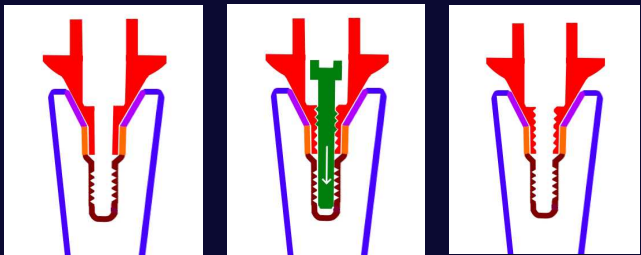


Beware Ankylos' locked-in abutment screw



Bicon? Expect to have to tap the abutment off

6. Two piece, internally threaded



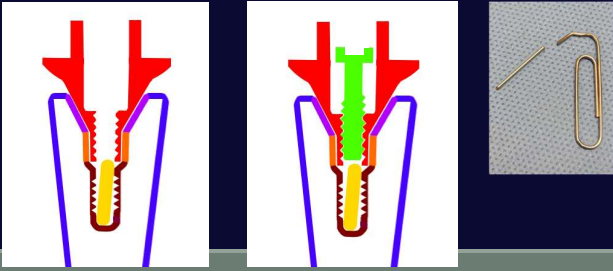
6. Two piece, internally threaded



- common with Zimmer and compatibles
- also some Nobel
- also some Straumann BLX (7°)

6. Two piece, internally threaded

- The Ol' paper clip trick:

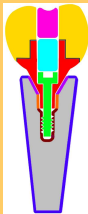


Our strategies for a stuck" abutment are:

1. Don't panic. This is not an emergency.
2. Take a radiograph.
3. Warn patient that this is a rescue mission, and obtain informed consent.
4. If a one-piece, thread timed abutment: attempt to unscrew
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4. Explantology

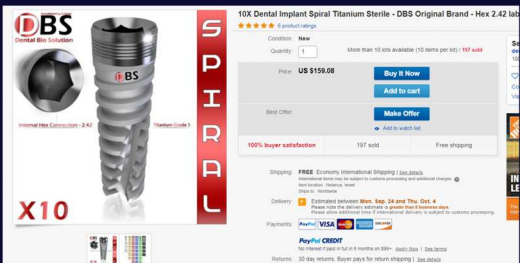


Why do integrated implants fail?

- Inadequate bone envelope
- Infection
- Crappy restoration
- Functional overload / parafunction
- Trauma

Often “multi-factorial”

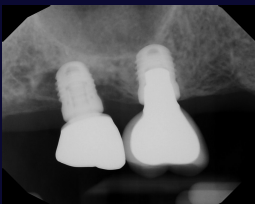
Time for another rant...about “economy” implants



USD\$15.91 each. What could possibly go wrong?

Assessing degree of difficulty

- Is it even still integrated?
- How much BIC (surface area) left?
- Patient general health
- Bone quality
- Local infection
- Implant design
- Adjacent anatomy



No different than a tooth removal...
but remember, it's ankylosed.

Removing an integrated implant

1. Don't panic. This is not an emergency. (sound familiar?)
2. Take a radiograph.
3. Obtain informed consent. LA. Remove restoration or expose implant.
4. Strategies:
 - implant driver or fixture mount
 - brand-specific explantation tool
 - pigtail style implant removal tools
 - reverse thread toothed implant removal tools
 - bone removal with trephines, burs, or ultrasonic / piezo
 - conventional tooth extraction techniques with elevators / forceps



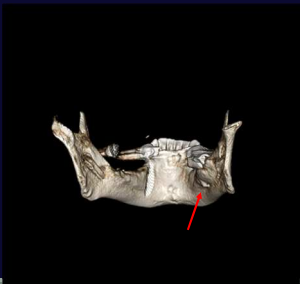
1. Is this an emergency?



Nope.

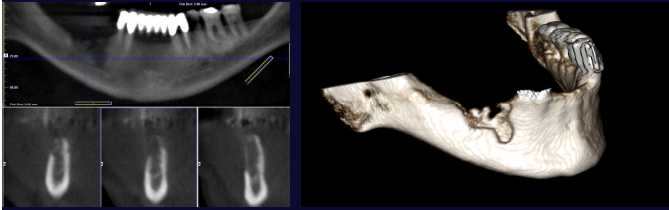


2. Would you take out a tooth without a radiograph?



3. Informed consent

What could possibly go wrong?



Strategy: implant driver or fixture mount

- Usually a fairly intimate fit to the inside of the implant
- Works best when only limited bone still present



Strategy: brand-specific explantation tool

- Always a fairly intimate fit to the inside of the implant
- Really designed for time of placement, but effective to 250 N-cm
- Most common w Straumann and clones



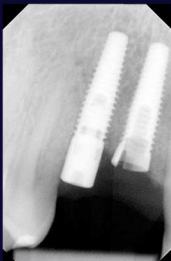
Whether cemented or screw retained, it is usually easier to remove the implant if you can remove the restoration first.

Insertion torque: too much of a good thing...



the infamous "flowered" implant

can happen during explantation as well



Strategy: pigtail-type implant removal tool

- Engages inside of implant counter-clockwise
- Can split implant ☹, or break off inside ☹ ☹



Strategy: reverse thread toothed implant removal tool (counter torque tool, aka CTRT)

- Clockwise piece screws into implant
- CCW toothed piece screws onto that



Strategy: bone removal with trephines, burs, or ultrasonic / piezo



Strategy: conventional elevator / forceps

- When internal of implant cannot be engaged
- Also with an implant fragment
- Often in combination with other techniques



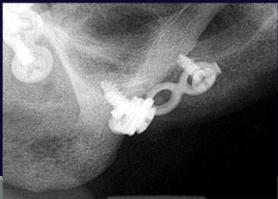
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Special situations to discuss

- Non-threaded implants
- One piece implants
- Root form implants from other materials
- Unusual root form designs
- Non-root form implants
- Other hardware



Homework items:

- What is the material and threading of your common implant(s)?
- What is available for "rescue kits" from your implant company? Borrow and practice with them.
- Make several flat blade drivers from old latch burs.
- Check out what you already have in your office. (!)
- Discuss with your staff how to book implant emergencies.

Shopping list:

- Latch +/- 4mm square driver handle (or multi-driver kit)
- Flat blade screwdriver tips
- Screw forks, small and large
- Endo explorer
- Burs: 700XXL, 1171L or similar
- Pigtail implant removal tool(s)
- Trephines
- Optional: implant removal kit, screw removal kit, or combination kit

Thanks and enjoy the rest of the meeting!

Bill Holden

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